

Monday, 8th April, 15:00, Auletta LAMC
talk by Andrew Dawson

Sustainability and the Engineer





Sustainability and the Engineer

What is “sustainability” for the engineer, and how can it be achieved?

Sustainability is the concept of the moment – but trying to grasp the concept in a way that’s usable by a highway or transportation engineer seems more difficult! At first there’s mention of CO₂ generation and, as engineers, we feel that we can cope with design and construction that minimizes this only to be told that we should also make sure our activities are sustainable in environmental, resource, social, economic, governance and quality of life terms (to name but a few)!

Taking action that delivers in all of these seems, very often, like trying to tie down a cloud with a rope. Even in one area there seems no clear agreement as to how we can be sure that our activity is truly sustainable. When a concrete company tell you that their material makes sustainable crash barriers at the same time as environmentalists attack cement manufacturers for creating unsustainable climate change by their use of energy in production, is sustainability no more than a buzzword? Can we safely get on with the job of trying to use sound engineering principles knowing that this is the most sustainable way, treating sustainability targets as something merely to be noted in passing? Or do we need to change our practice fundamentally and how can we tell whether and how we should change?

The presentation will attempt to answer some of these points by discussing the nature of the sustainability concept, the good reasons that motivate a sustainable agenda, and the inherent tensions between it and an engineering approach. It will attempt to bring the tangible and the intangible together so that engineers can better appreciate the framework in which they increasingly have to operate and so that they can make their own contribution to a way of life more in harmony with our world and the people in it.

Given by

Andrew Dawson, University of Nottingham, Nottingham Transportation Engineering Centre, UK

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Andrew Dawson

Associate Professor, Faculty of Engineering



Biography

Mr Dawson started his career in civil engineering as a Technician with major civil engineering contractors. After university study he spent 5 years with civil engineering consultants on a wide variety of geotechnical work as a geotechnical, then senior geotechnical engineer. This included design of projects in the UK, Africa & Asia involving earth dams, mine pit slope stability assessments, highway schemes, water resource and hydraulic studies, advanced laboratory testing of soils, earthworks design, finite element analysis and many site investigation contracts. Since joining the University of Nottingham he has been retained as an expert consultant on several road materials projects. He's engaged in many research studies in pavement foundations, materials recycling and pavement design, performance and maintenance. He is responsible for undergraduate teaching in geomechanics, including courses on geo-environmental engineering and geology. He is exchange student tutor.

Expertise Summary

Granular materials for road & airport construction, Low-volume roads, Pavement foundations, Environmental aspects of road construction materials, Geosynthetics in roads, Pavement drainage, Road sub-grade soil behaviour, Response of geotechnical materials to large number of cyclically applied loads, Climate Change effects on Highways, Recycling.

Teaching Summary

Geomechanics Geo-environmental engineering Geology Low volume roads

Research Summary

+ Looking at water movements in the road environment, partly by numerical modelling, using input data from other projects. The movement of contaminants in this field is particularly of interest. + Studying granular material behaviour from a statistical, particle-based, theoretical approach.+ Investigating means of separating arisings from trench excavations into their useful fractions for re-use. + Design and evaluation of unsealed pavement constructions + Microstructural evaluation of concrete and stabilised materials + Heat storage and collection in pavements + Effects of climate change on pavement maintenance and performance

Selected Publications

DAWSON, A.R., HILL, A. and BOOTHROYD, P., 2006. The Hydraulic and Geo-Environmental Behavior of the Sub-Pavement Environment. In: , ed., Pavement Mechanics and Performance STP No. 154. American Society of Civil Engineers, Reston, Virginia, USA. 287-295

KORKIALA-TANTTU, L. and DAWSON, A.R., 2007. Relating Full-Scale Pavement Rutting to Laboratory Permanent Deformation Testing International Journal of Pavement Engineering. 8(1), 19-28

DAWSON, A, BERNTSEN, G, KOLISOJA, P, JOHANSSON, S and SAARENKETO, T. AND MUNRO, R., 2006. Developing appropriate engineering responses to seasonal effects for pavements serving remote communities. In: Cold Regions Engineering 2006: Current Practice in Cold Regions Engineering Reston, VA: American Society of Civil Engineers. 14.1-14.8

WERKMEISTER, S., DAWSON, A.R. and WELLNER, F., 2005. Permanent deformation behaviour of granular materials Road Materials and Pavement Design. 6.(1), 31-51